



# Traffic Safety Technical Assistance Center

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## Multidisciplinary Traffic Safety Research Program

### Housed in ...

- University of Massachusetts Amherst
- College of Engineering
- Civil & Environmental Engineering
- University of Massachusetts Transportation Center

# MSP TS/TAC - Types of Services

Strategic Planning  
Program Development  
Grant Writing

Field Data Collection

Problem Id  
Project Planning  
Evaluation

Mobile Apps  
Web-Based Tools  
Resource Toolkits

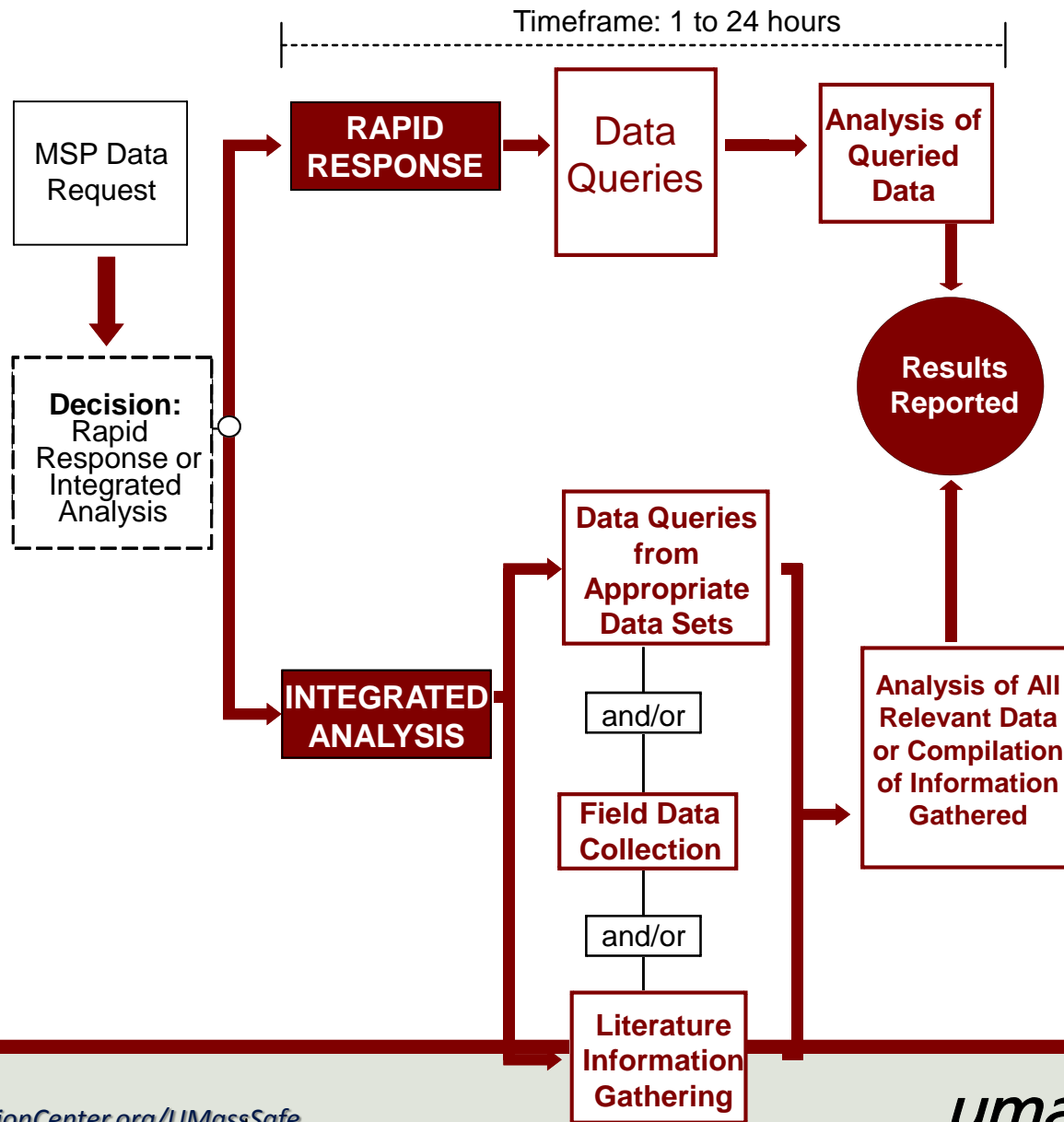
Crash Data Analysis

Crash Mapping  
Spatial Analysis

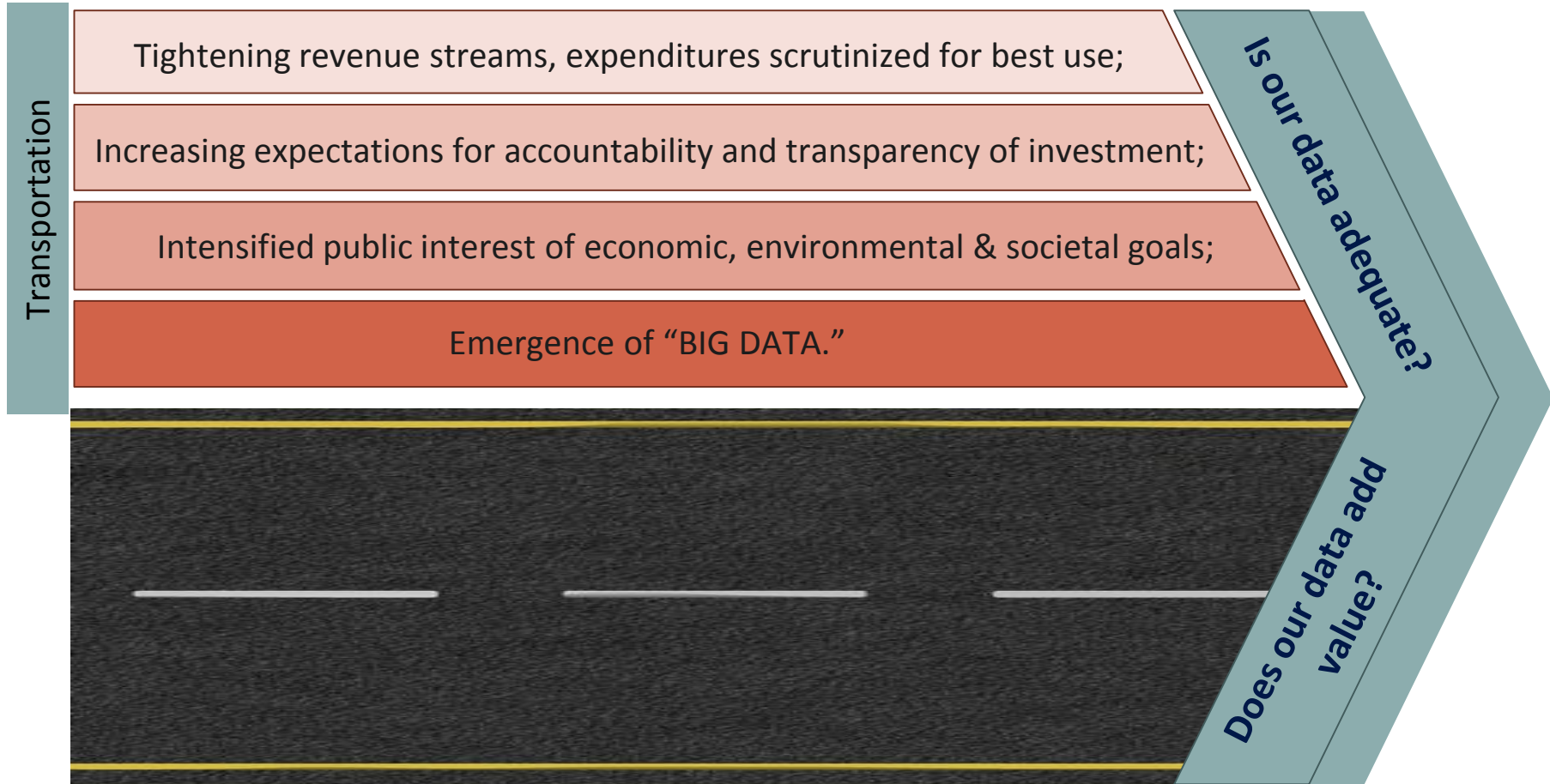
Online & Classroom Law  
Enforcement Training

Curriculum Development

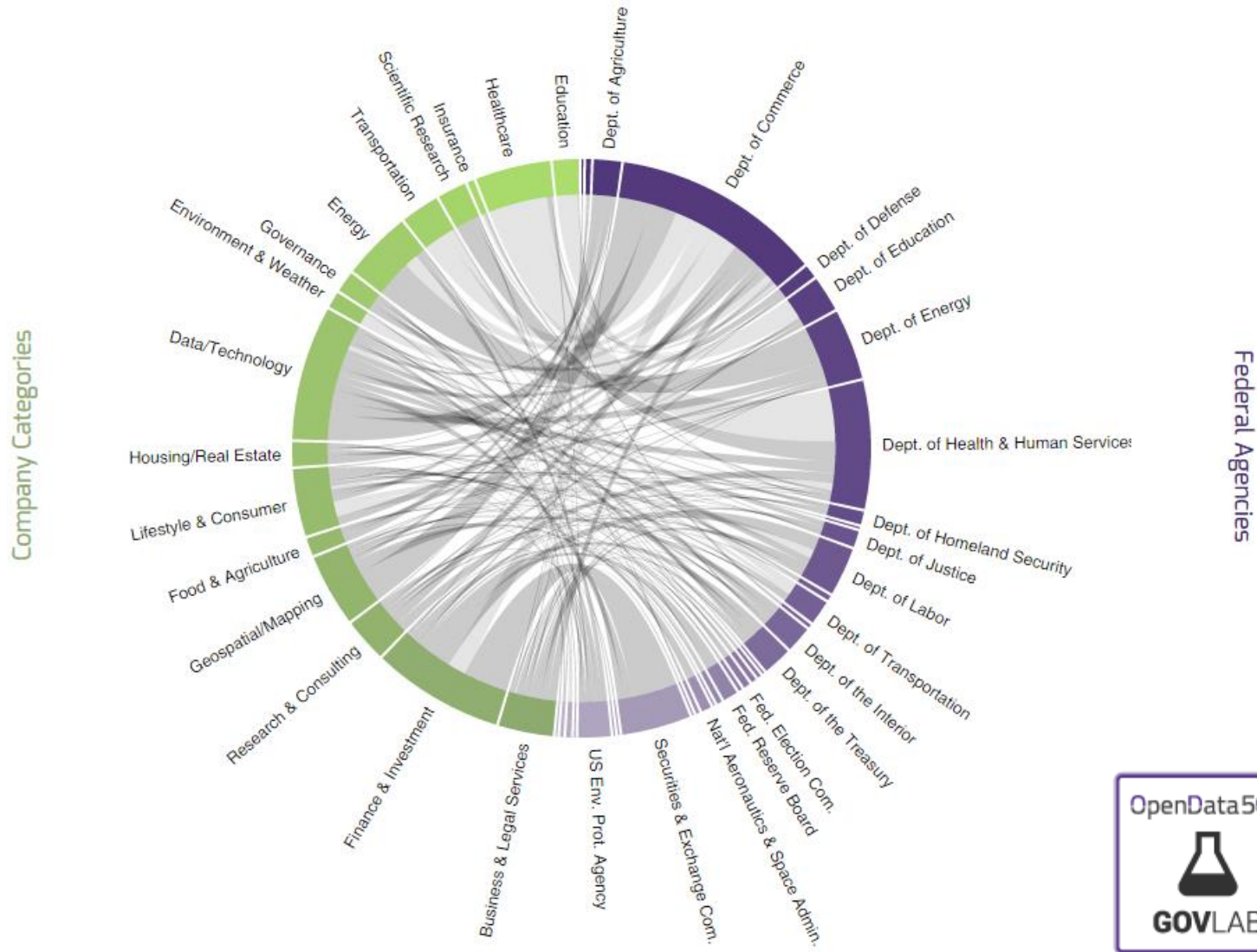
# TS/TAC – Conceptual Framework



# Emerging Trends and Questions?



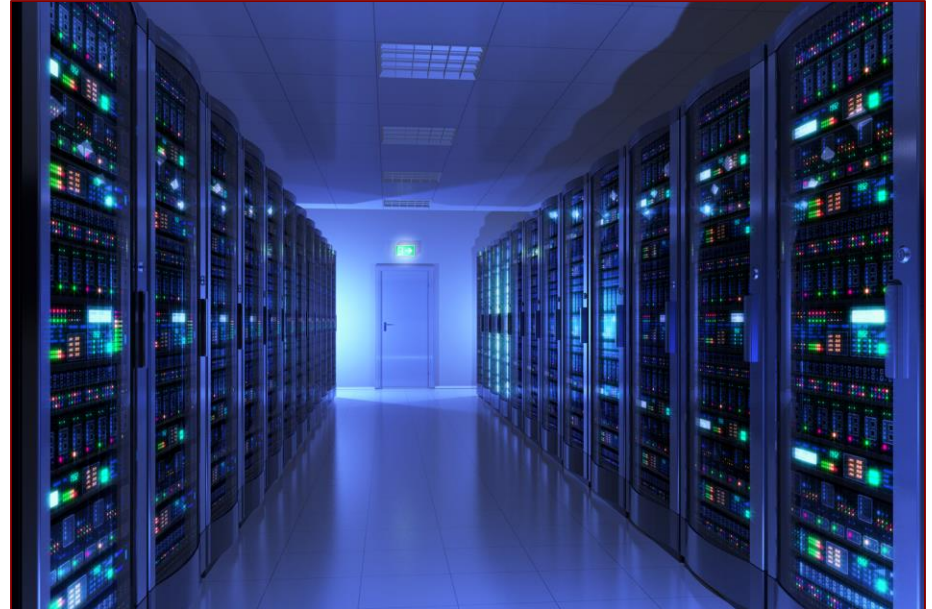
# Data is Everywhere



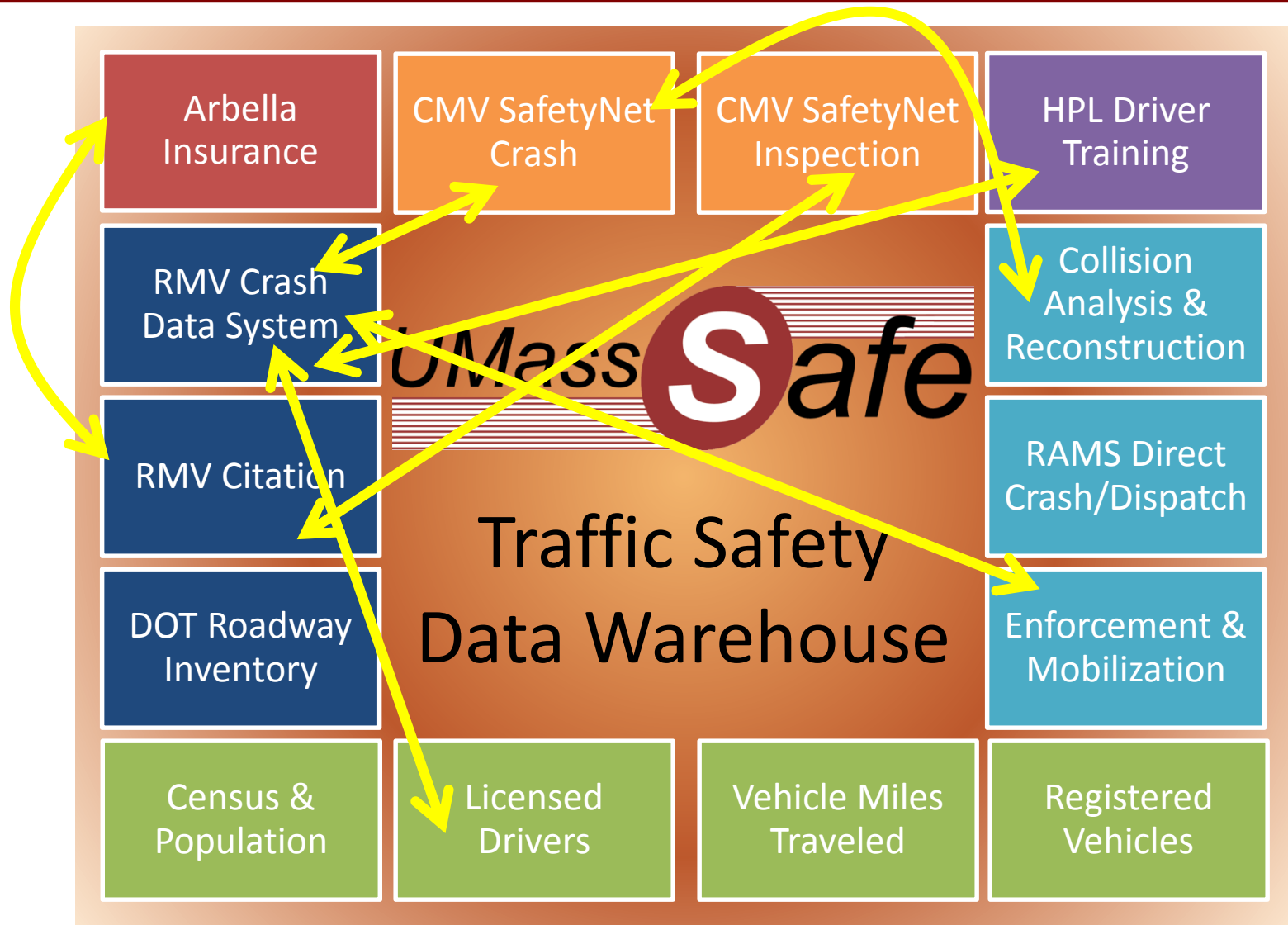


# UMassSafe Traffic Safety Data Warehouse

- Serves as a central repository for data from many sources
- Creates a location to provide historical view of events
- Serves as a decision support system
- Datasets – 14 datasets as well as linked datasets, 2001-2014
- Traffic Safety Technical Assistance Center (TS/TAC)



# Data Linkage






# Direct Warehouse Access

```
OraEdit PRO - [analyst@msdb]
Database Source Debug Version Control Edit Tools SQL Library Favorites View Window Help
all_for_safety_clean.sql Sql11* fatal counts.sql
01 select distinct
02
03 count(p.crash_num),
04 to_char(c.CRASH_DATE, 'YYYY')
05
06
07 from
08 cds.CRASH c,
09 cds.VEHICLE v,
10 cds.person p,
11 cds.OCCUPANT o,
12 cds.DRIVER d
13
14 where
15 C.CRASH_DATE between to_date('01012007', 'MMDDYYYY') and to_date('06302009', 'MMDDYYYY')
16 and p.PERS_TYPE_CODE = 1
17 and d.DRVR_CNTRB_CIRC_CODE_1 = 2
18 and o.EJCTN_CODE = 1
19 and (
20 v.SEQUENCE_EVENT_1 = 40 or
21 v.SEQUENCE_EVENT_1 = 41
22 )
23 and c.CRASH_NUMB = p.CRASH_NUMB(+)
24 and c.CRASH_NUMB = v.CRASH_NUMB(+)
25 and p.CRASH_NUMB = o.CRASH_NUMB(+)
26 and o.CRASH_NUMB = d.CRASH_NUMB(+)
27 and p.PERS_NUMB = o.PERS_NUMB(+)
28 and o.PERS_NUMB = d.PERS_NUMB(+)
29 and o.VEHC_UNIT_NUMB = v.VEHC_UNIT_NUMB
30
31
32 group by
33 to_char(c.CRASH_DATE, 'YYYY')
34
```

# Web Interface



## MASSACHUSETTS Commercial Vehicle Data Tool

[About this site](#) [Help](#) [Sign Out](#)

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Home
Crash Maps
Data Explorer

Change the dates for this query »

YEARS OF DATA

2005 ▼ to 2012 ▼

[Change Years →](#)

---

Customize the data table »

ROWS

Crash: Year ▼

COLUMNS

Crash: Day of Week ▼

DISPLAY DATA AS

Counts  Percentages  Both

[Change Table →](#)

YOU ARE VIEWING:

**TOTALS: Commercial Vehicle Crashes from 2005 to 2012**

CRASH: YEAR BY CRASH: DAY OF WEEK

	01 - Sunday	02 - Monday	03 - Tuesday	04 - Wednesday	05 - Thursday	06 - Friday	07 - Saturday	Total
2005	36	139	180	183	181	158	63	940
2006	62	276	257	249	255	206	90	1395
2007	69	326	344	343	321	367	132	1902
2008	112	396	514	521	430	499	167	2639
2009	111	409	386	436	405	388	137	2272
2010	83	343	369	358	385	365	109	2012
2011	76	346	423	363	400	428	155	2191
2012	70	359	368	368	408	382	133	2088
<b>Total</b>	<b>619</b>	<b>2594</b>	<b>2841</b>	<b>2821</b>	<b>2785</b>	<b>2793</b>	<b>986</b>	<b>15439</b>

[Download this table \(.csv file\)](#)

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**DETAILED DATA: Individual Crash Data for 50 Crashes**

*Click on the table above to show other crashes*

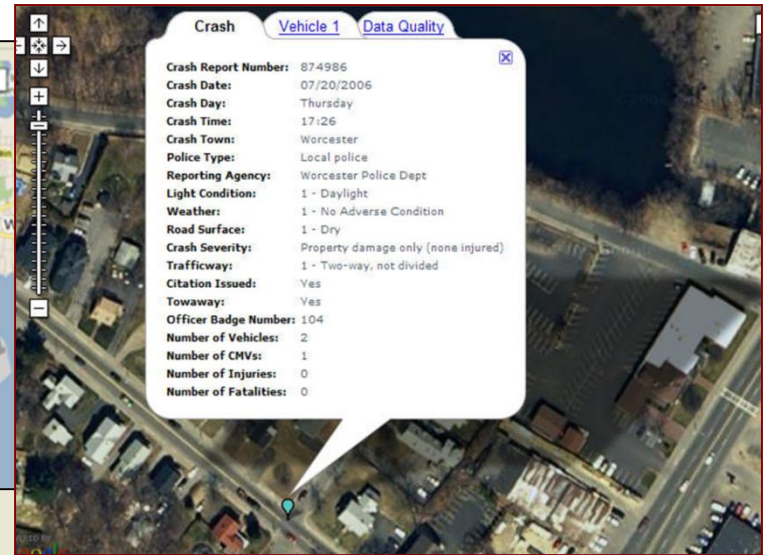
DATE	LOCATION	CARRIER
Sun January 02, 2005	47 (Washington St @ Adrienne Drive And Hickory Lane)	Cyn Oil Corporation
Mon January 03, 2005	152 (Rte 1 South)	New England Marine Resources
Mon January 03, 2005	32 (Cambridge Street)	Sinclair Trucking
Mon January 03, 2005	175 (Rte 93 North)	Jbl Bus Lines Inc
Mon January 03, 2005	118 (Rte 91 North)	Max Finkelstein Inc
Tue January 04, 2005	261 (Rte 93 South)	Les Entreprises Solidline Inc

Filter the data in the table »

FILTER BY

- [Crash: Citation Issued »](#)
- [Crash: County »](#)
- [Crash: Day of Week »](#)
- [Crash: First Harmful Event »](#)
- [Crash: Hour »](#)
- [Crash: Hour Group »](#)
- [Crash: Light Condition »](#)
- [Crash: Manner of Collision »](#)
- [Crash: Month »](#)
- [Crash: Number of CMVs »](#)
- [Crash: Number of Fatalities »](#)
- [Crash: Number of Injuries »](#)
- [Crash: Number of Vehicles »](#)
- [Crash: Quarter »](#)
- [Crash: Quarter and Year »](#)

# Map Web Interface



**MASSACHUSETTS**  
**Commercial Vehicle Data Tool**

Home   Crash Maps   Data Explorer   Data Quality

The Commercial Vehicle Data Tool provides access to commercial vehicle crash data collected by police officers in Massachusetts.


**UMASSSAFE SAFETY DATA WAREHOUSE**

The UMassSafe Safety Data Warehouse has been developed as a tool for maximizing the use of highway safety data. Data stored in the warehouse include traditional datasets such as crash and citation data as well as less traditional highway safety data such as health care data and commercial vehicle safety data.

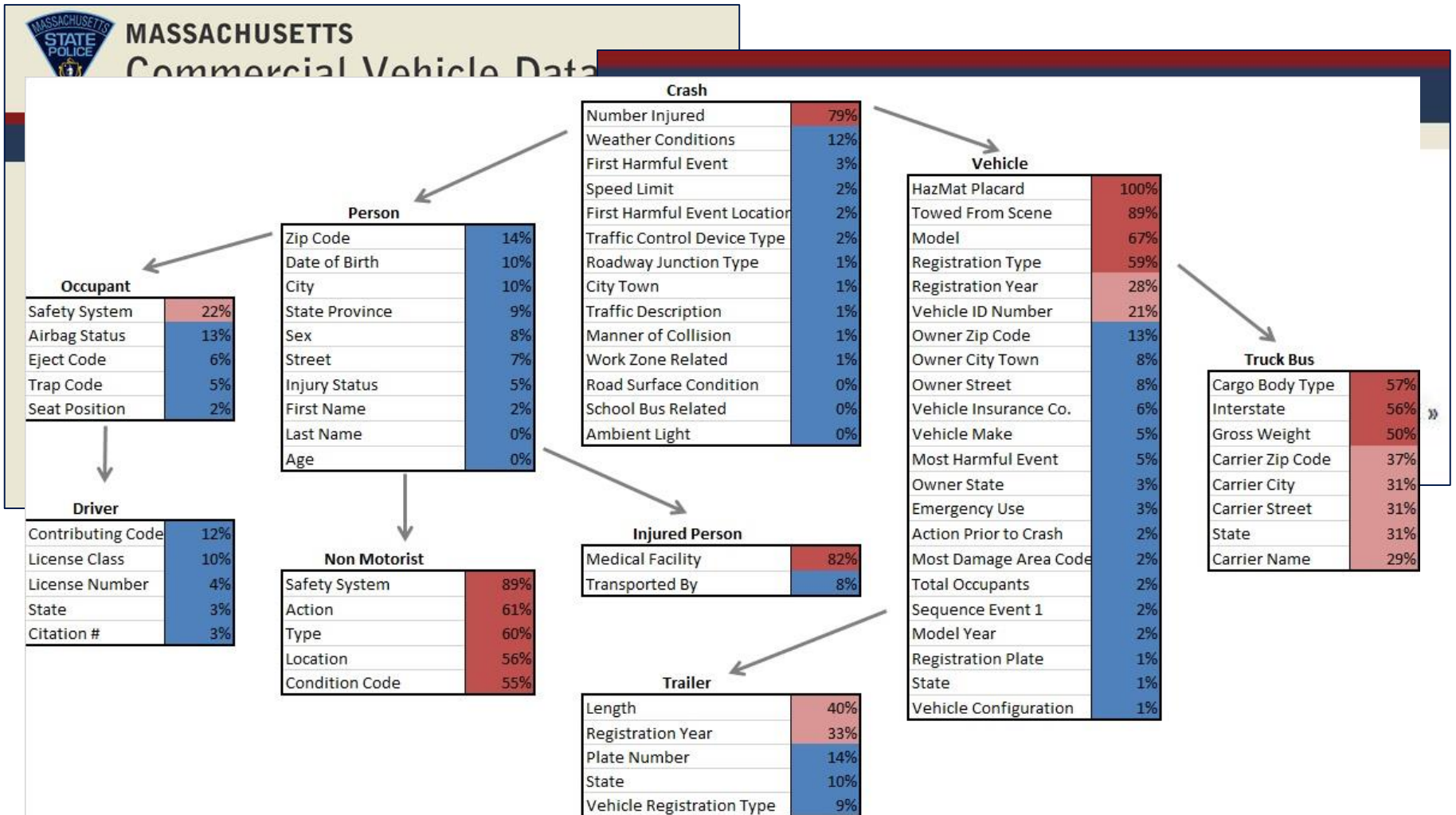
**THE IMPORTANCE OF CRASH DATA**

Law enforcement personnel and highway safety stakeholders utilize crash data to plan crash prevention programming and targeted enforcement. The integrity of crash data is fundamental to the work done by the Massachusetts State Police Commercial Vehicle Enforcement Section (MSP CVES) and other safety professionals across the Commonwealth, in order to prevent crashes. Thus, improving the accuracy, speed and completeness of commercial vehicle crash (CMV) data continues to be an ongoing goal of the Commonwealth.

In addition, states are required to CMV crashes to the Federal Motor Carrier Safety Administration (FMCSA) who compiles this data and evaluates the quality of each states crash data, specifically the data's completeness, timeliness, accuracy, and consistency. States receive a ranking of "Good," "Fair" or "Poor" for each measure as well as an overall rating.

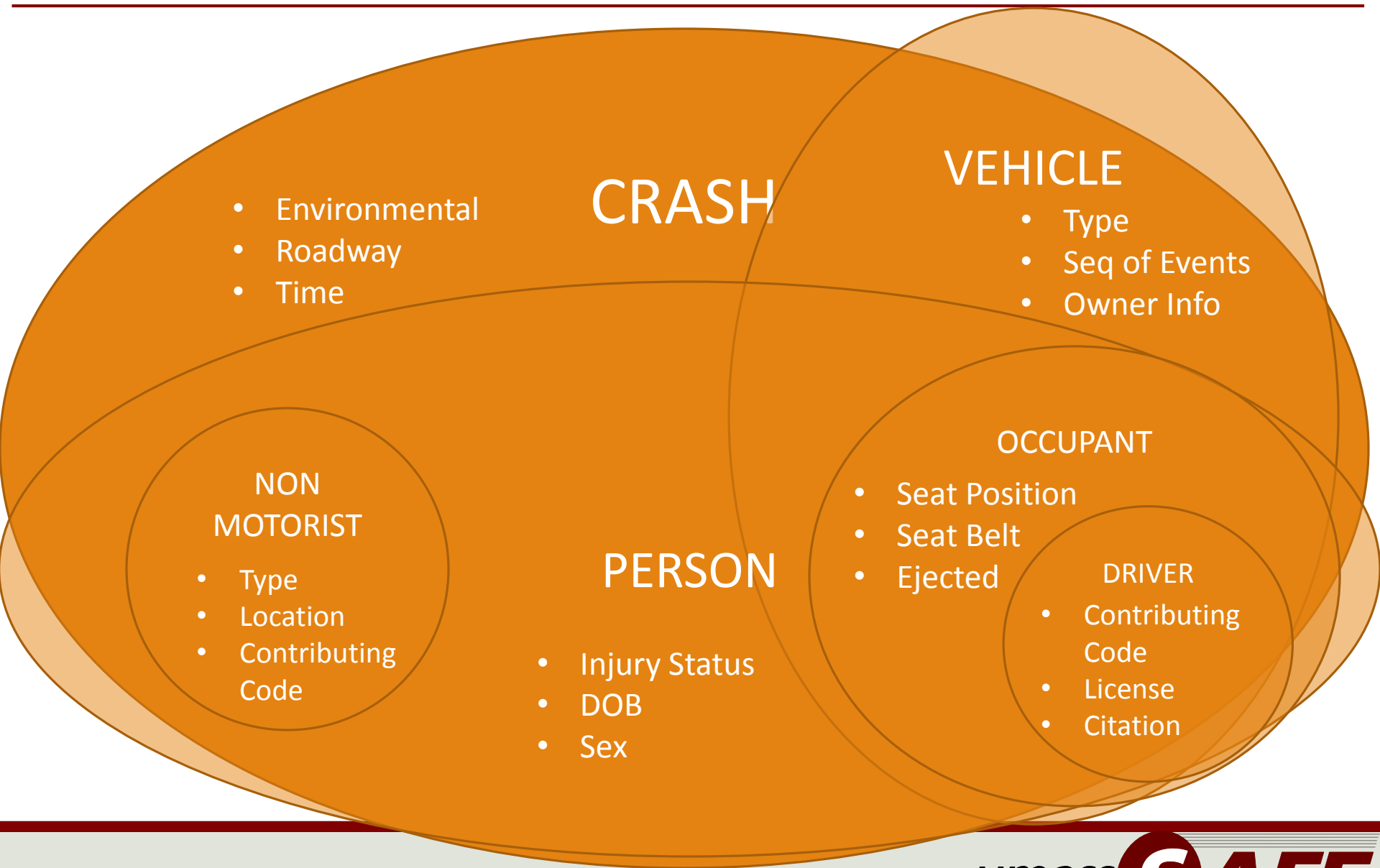


# Web Interface - Data Quality Component





# CRASH ATTRIBUTE RELATIONSHIPS

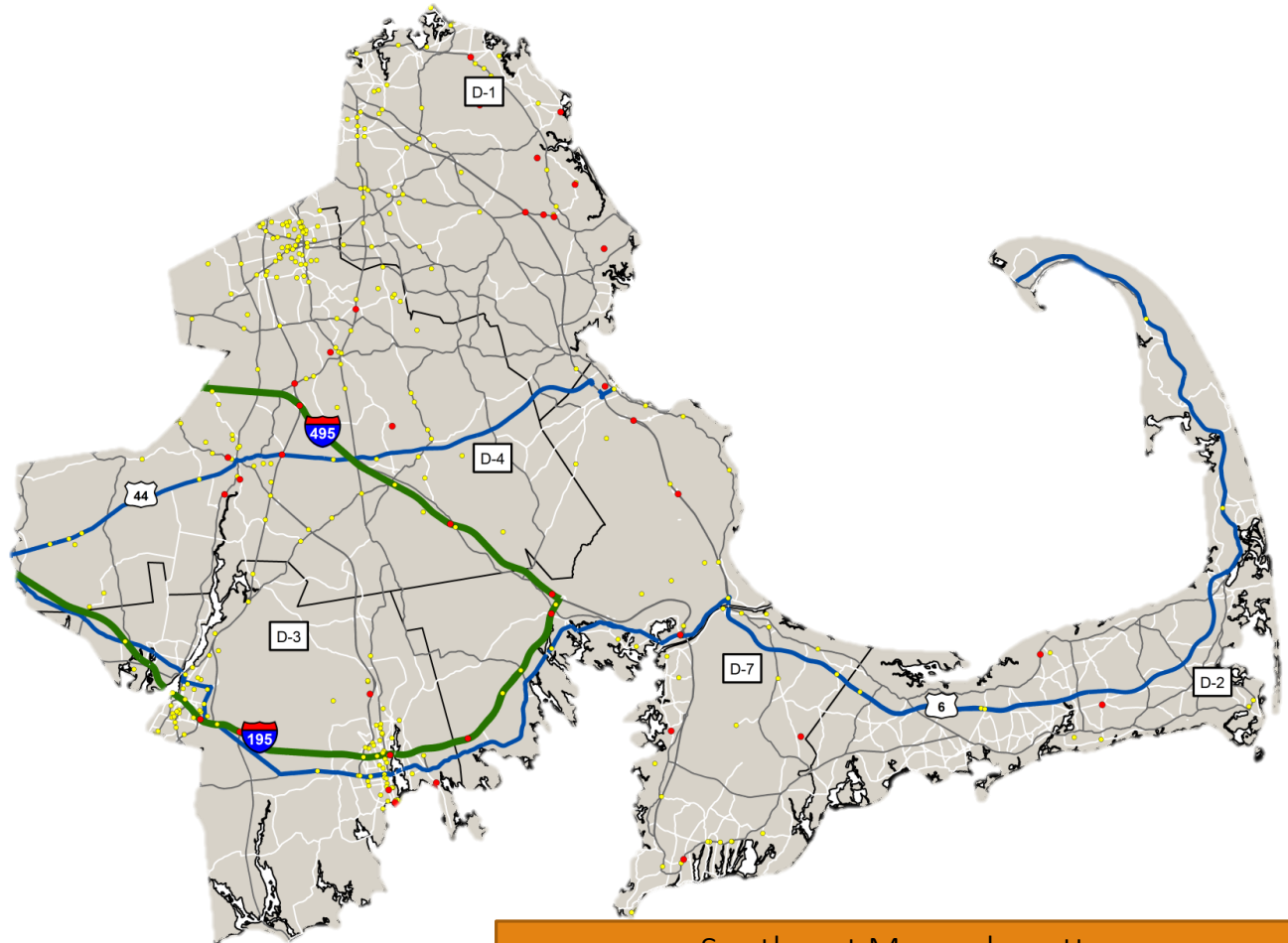


# Location Analyses

Identify high crash areas (intersections, corridors, etc)

Use additional data for characteristics of those crashes

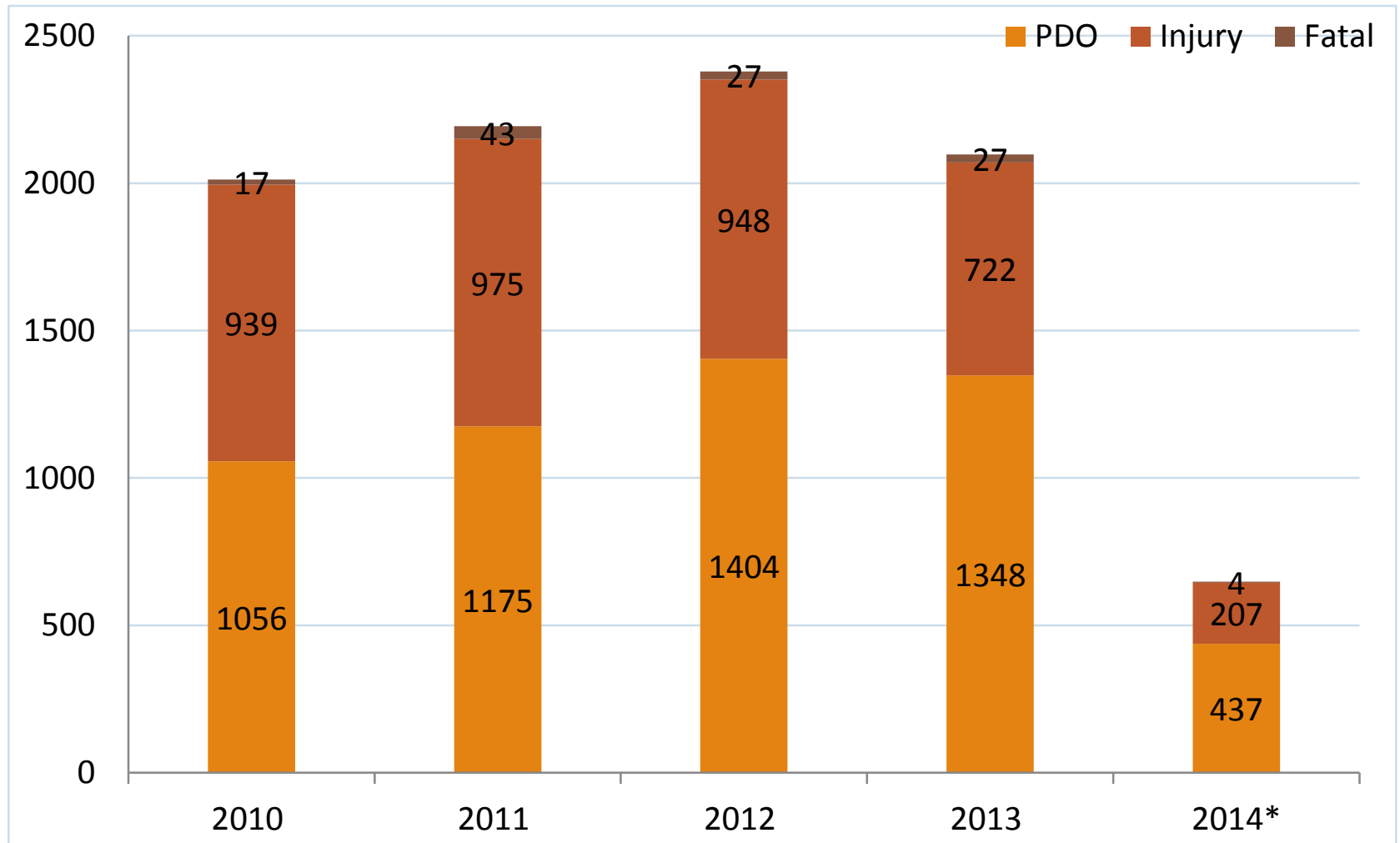
Combine GIS with linked data for cost/benefit analysis



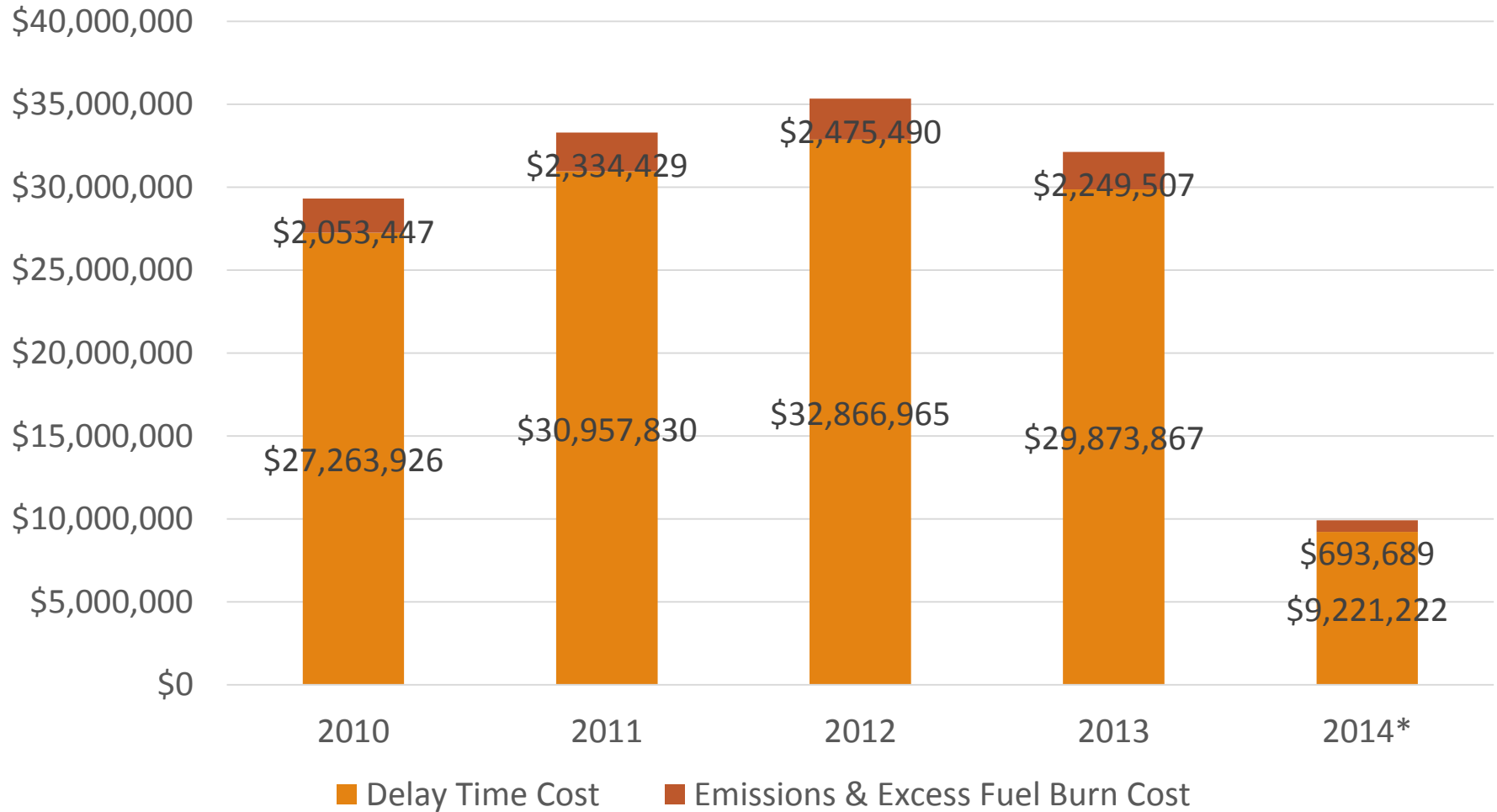
Southeast Massachusetts  
Fatal/Incapacitating Injury Crashes



# CMV Crashes by Severity

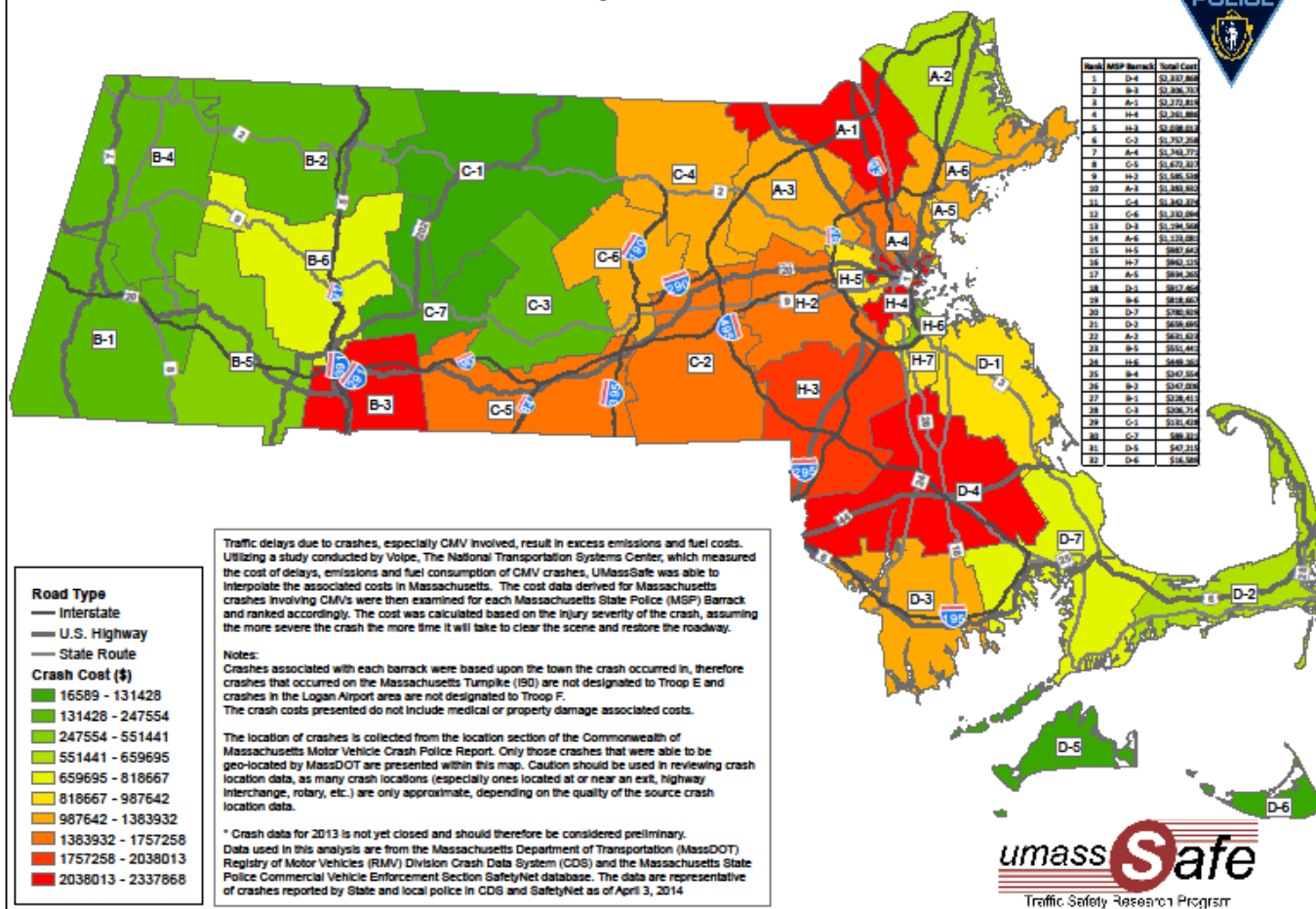


# Delay & Environmental Costs of CMV Crashes



# Delay & Environmental Costs of CMV Crashes

## Massachusetts Commercial Motor Vehicle Crash Cost of Emissions and Excessive Fuel Burn by Barrack, 2013\*



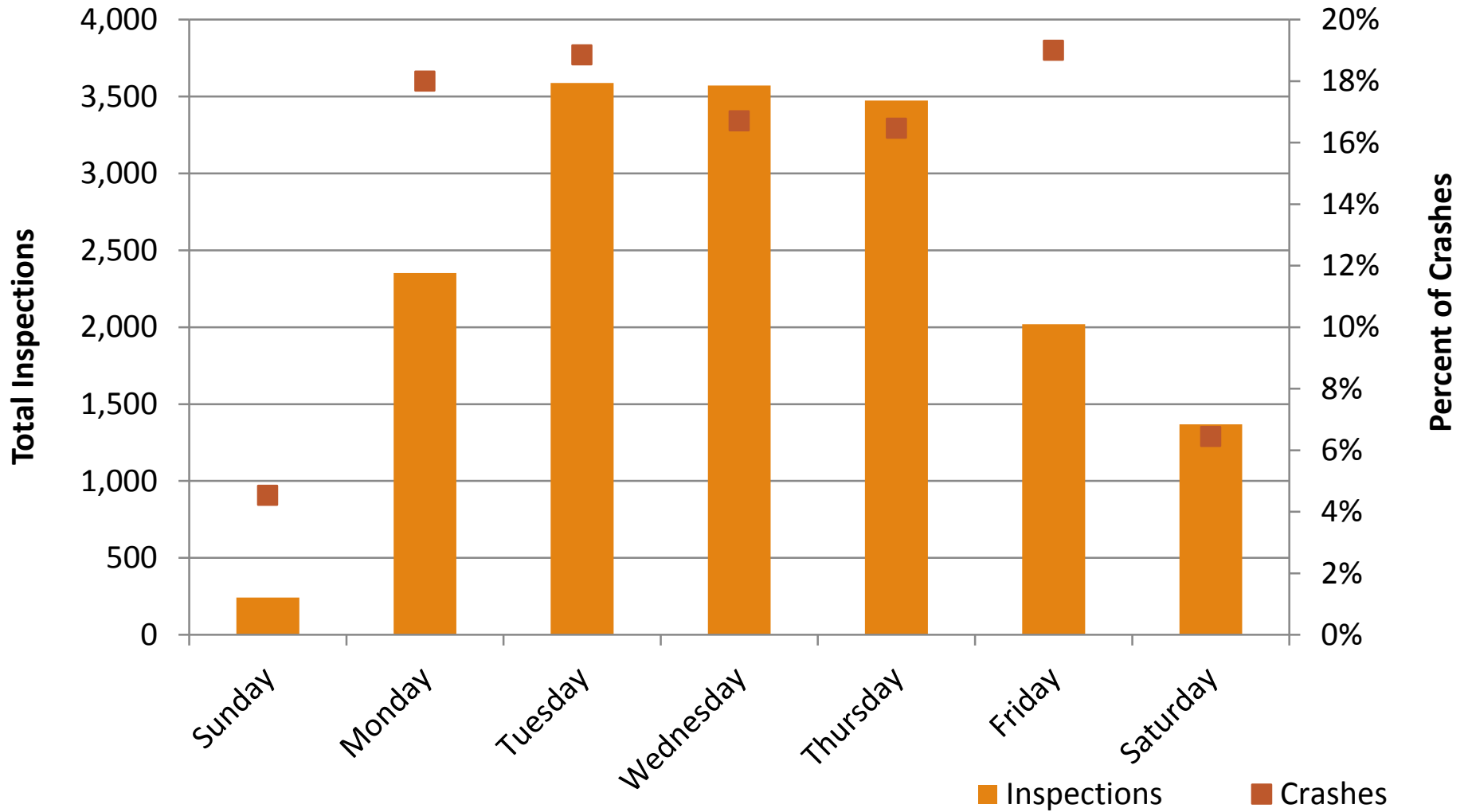
Rank	MSP Barrack	Total Cost
1	D-4	\$2,337,868
2	B-3	\$2,306,737
3	A-1	\$2,272,819
4	H-4	\$2,261,886
5	H-3	\$2,038,013
6	C-2	\$1,757,258
7	A-4	\$1,743,771
8	C-5	\$1,672,327
9	H-2	\$1,585,538
10	A-3	\$1,383,932
11	C-4	\$1,342,374
12	C-6	\$1,232,094
13	D-3	\$1,194,568
14	A-6	\$1,123,081
15	H-5	\$987,642
16	H-7	\$962,125
17	A-5	\$934,265
18	D-1	\$917,464
19	B-6	\$818,667
20	D-7	\$780,929
21	D-2	\$659,695
22	A-2	\$631,623
23	B-5	\$551,441
24	H-6	\$449,161
25	B-4	\$247,554
26	B-2	\$247,006
27	B-1	\$228,411
28	C-3	\$206,714
29	C-1	\$131,428
30	C-7	\$89,321
31	D-5	\$47,215
32	D-6	\$16,589

# Top Cited Violations in CMV Crashes

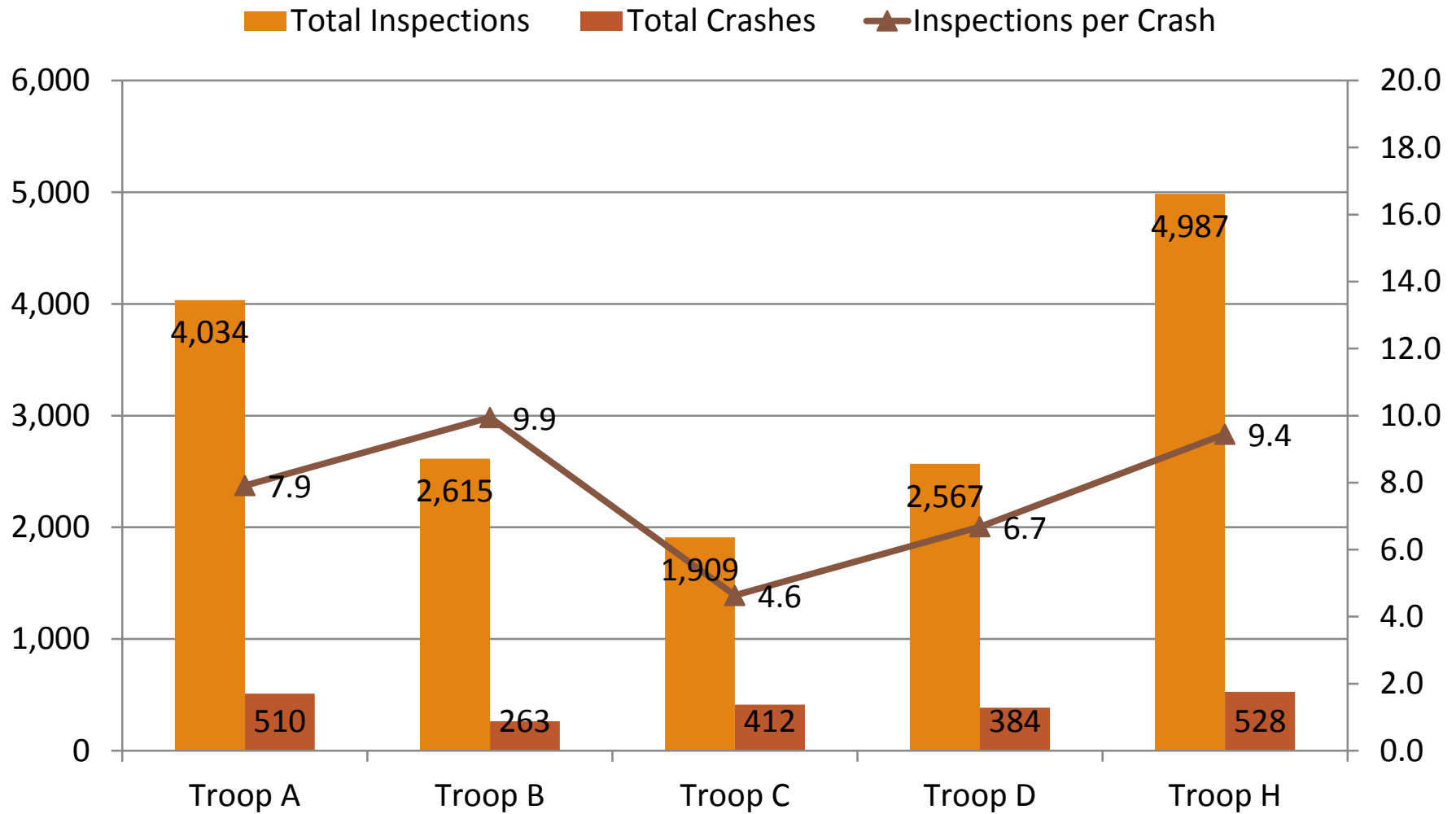
## Most Frequently Issued Citations in Crashes Involving CMVs

CMV Driver	Ranking	Non-CMV Driver
State Highway Violation	1	Lane Violation
Lane Violation	2	State Highway Violation
RMV/FED Safety Regulations	3	Driving To Endanger
Speeding	4	Operator Unlicensed
Driving To Endanger	5	Failure To Stop
Turnpike-Negligent Operation	6	Speeding
Failure To Stop	7	License Suspended
Minor Traffic	8	Driving While Intoxicated Liquor Violation
Leave Scene Property Damage	9	Leave Scene Property Damage
Operator Unlicensed	10	Right Of Way Intersection

# CMV Inspection by Day of the Week



# CMV Inspection/Crash Counts by Troop





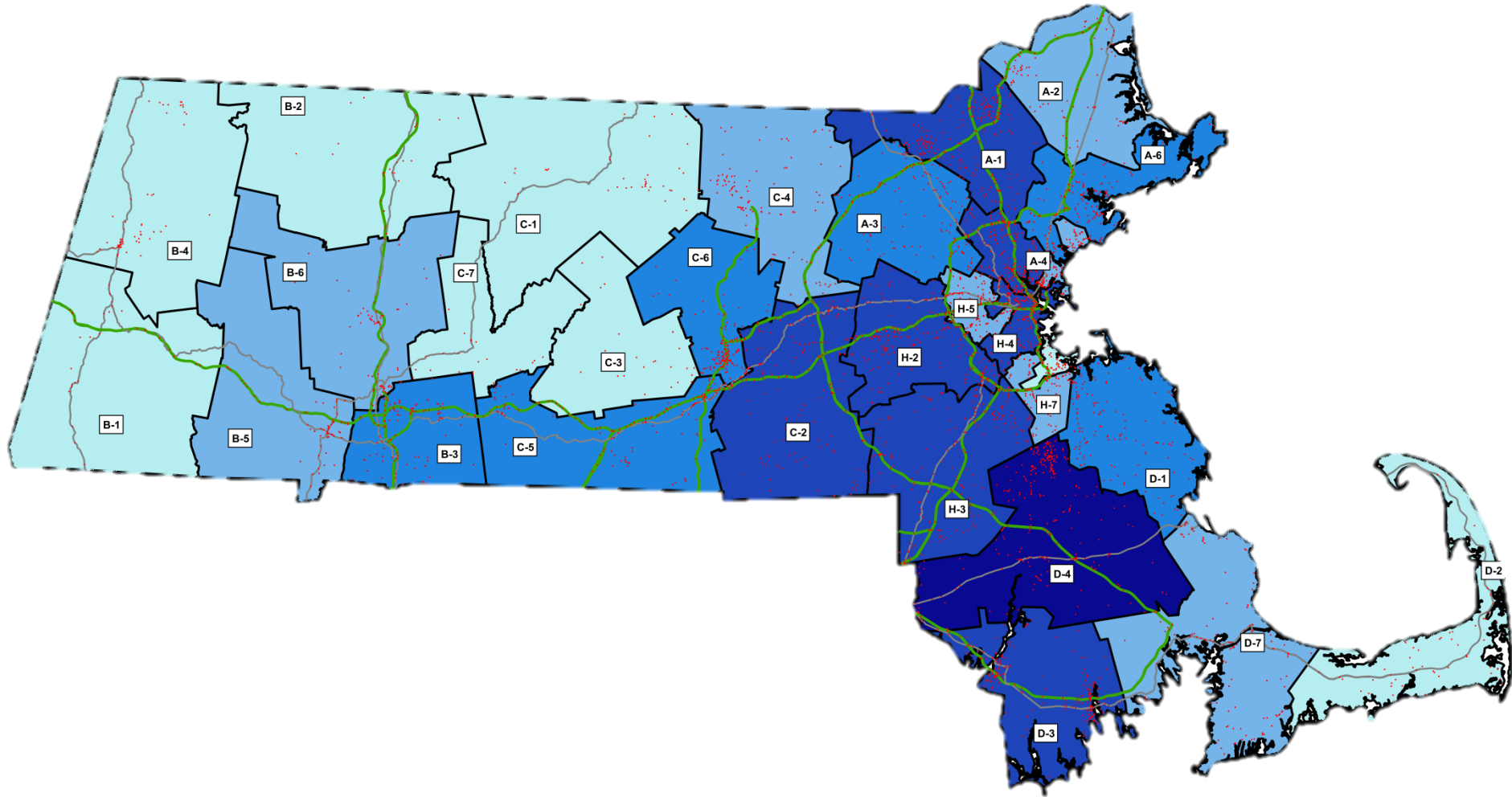
# CMV Inspection/Crash Ratio by Barrack

MSP	Inspection Level							Total Inspections	Total Crashes	Inspections per Crash
	I	II	III	IV	V	VI	VII			
Troop A	537	1,694	1,445	36	222	0	100	4,034	510	7.9
A-1	105	417	353		8		10	893	138	6.5
A-2	188	301	140	34	9		9	681	40	17.0
A-3	63	226	289		37			615	89	6.9
A-4	60	344	502	1	73		4	984	114	8.6
A-5	74	148	120	1	81		60	484	56	8.6
A-6	47	258	41		14		17	377	73	5.2
Troop B	281	961	1,087	4	242		40	2,615	263	9.9
B-1	1	12	5					18	15	1.2
B-2	24	21	22		22			89	15	5.9
B-3	182	764	996	4	192		25	2,163	140	15.5
B-4	6	32	4				10	52	14	3.7
B-5	34	33	19					86	29	3.0
B-6	34	99	41		28		5	207	50	4.1
Troop C	472	589	624		190		34	1,909	412	4.6
C-1	3	18	3		28			52	9	5.8
C-2	223	276	277		112			888	115	7.7
C-3	7	7	2		9			25	13	1.9
C-4	40	132	140		26		13	351	89	3.9
C-5	166	79	135		7			387	100	3.9
C-6	29	65	57		8		21	180	80	2.3
C-7	4	12	10					26	6	4.3
Troop D	568	1,505	383		93		18	2,567	384	6.7
D-1	95	228	45		27			395	61	6.5
D-2	65	28	1				4	98	45	2.2
D-3	94	227	79		20		13	433	76	5.7
D-4	193	391	129		24			737	148	5.0
D-5									3	0.0
D-6									1	0.0
D-7	121	631	129		22		1	904	50	18.1
Troop H	935	2,863	698	2	459	1	29	4,987	528	9.4
H-2	167	175	24	1	1		16	384	103	3.7
H-3	326	943	235		48			1,552	126	12.3
H-4	198	1,040	266	1	282	1	13	1,801	138	13.1
H-5	20	57	10		5			92	67	1.4
H-6	35	180	30		6			251	30	8.4
H-7	189	468	133		117			907	64	14.2
Total	2,793	7,612	4,237	42	1,206	1	221	16,112	2,097	7.7

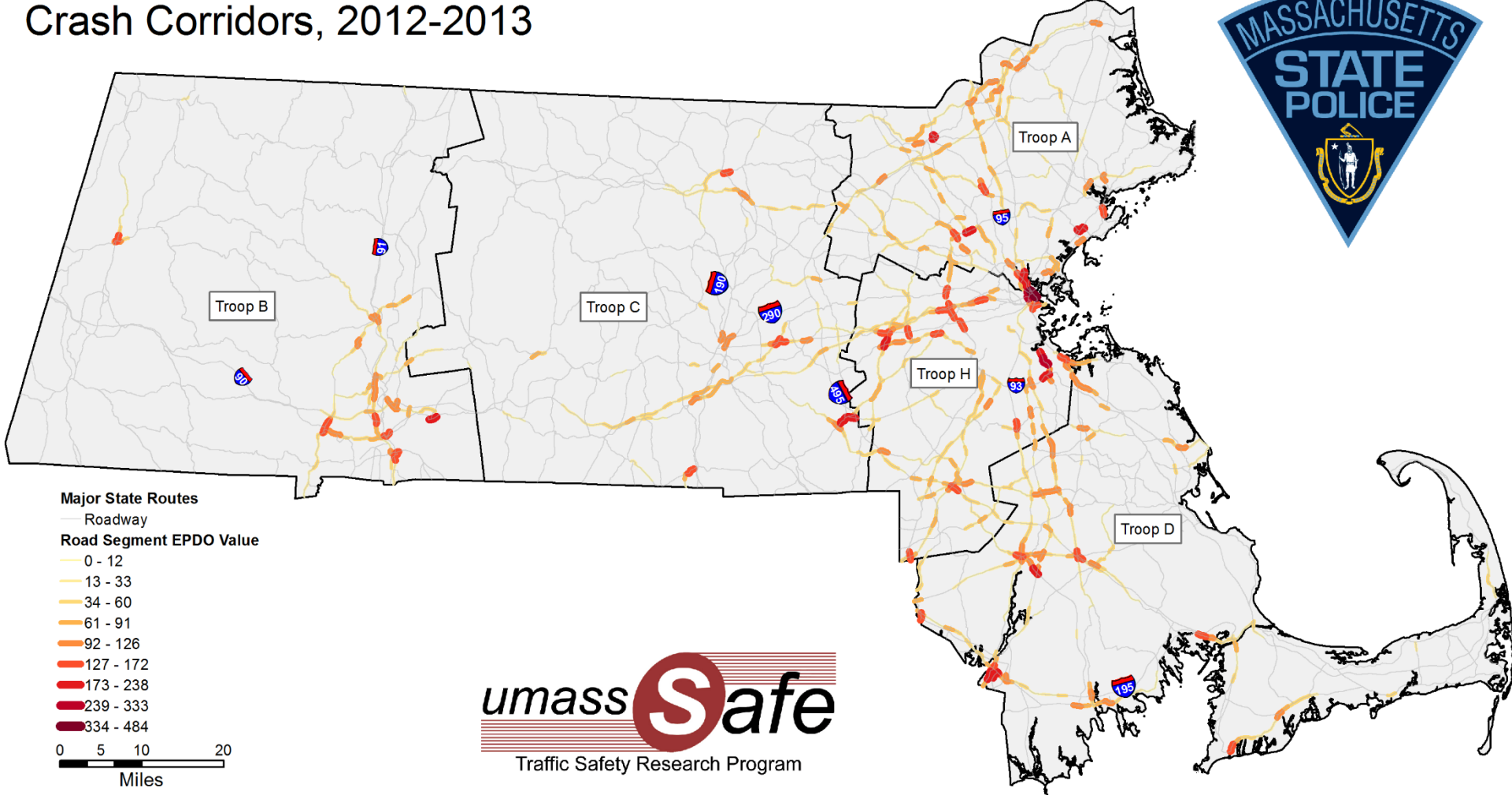
# CMV Inspection/Violation Ratio by Carrier

Carrier	Total Inspections	Violation Rate
CDE CORPORATION	29	13.10
UPS FREIGHT	25	3.44
RILEY BROTHERS INC	34	2.50
FUNG WAH BUS TRANSPORTATION INC	25	2.48
LUCKY STAR	66	1.67
FEDEX GROUND	37	1.35
GO BOSTON SHUTTLE	40	1.20
J P NOONAN TRANSPORTATION INC	28	1.14
ALLIED WASTE SERVICES OF MASSACHUSETTS LLC	34	1.12
BRIDGEWELL INC	52	0.90
CAVALIER COACH TRAILWAYS	36	0.86
BOLT BUS & YO BUS	99	0.75
PAUL REVERE TRANSPORTATION LLC	124	0.66
AA TRANSPORTATION CO INC	33	0.55
BONANZA ACQUISITION LLC	42	0.52
PETER PAN BUS LINES INC	236	0.51
KING WARD COACH LINES	35	0.46

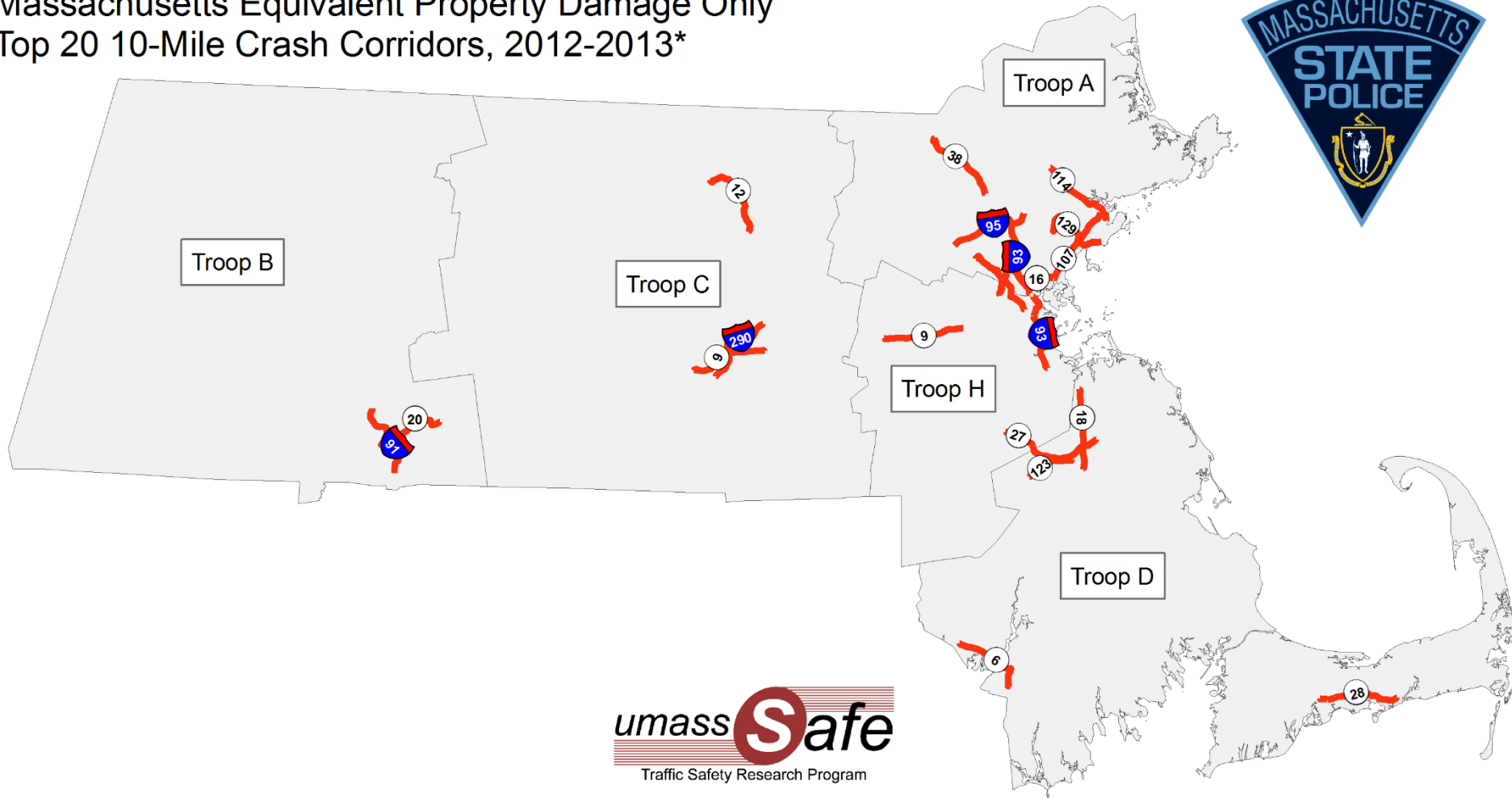
# Crash Corridor Mapping



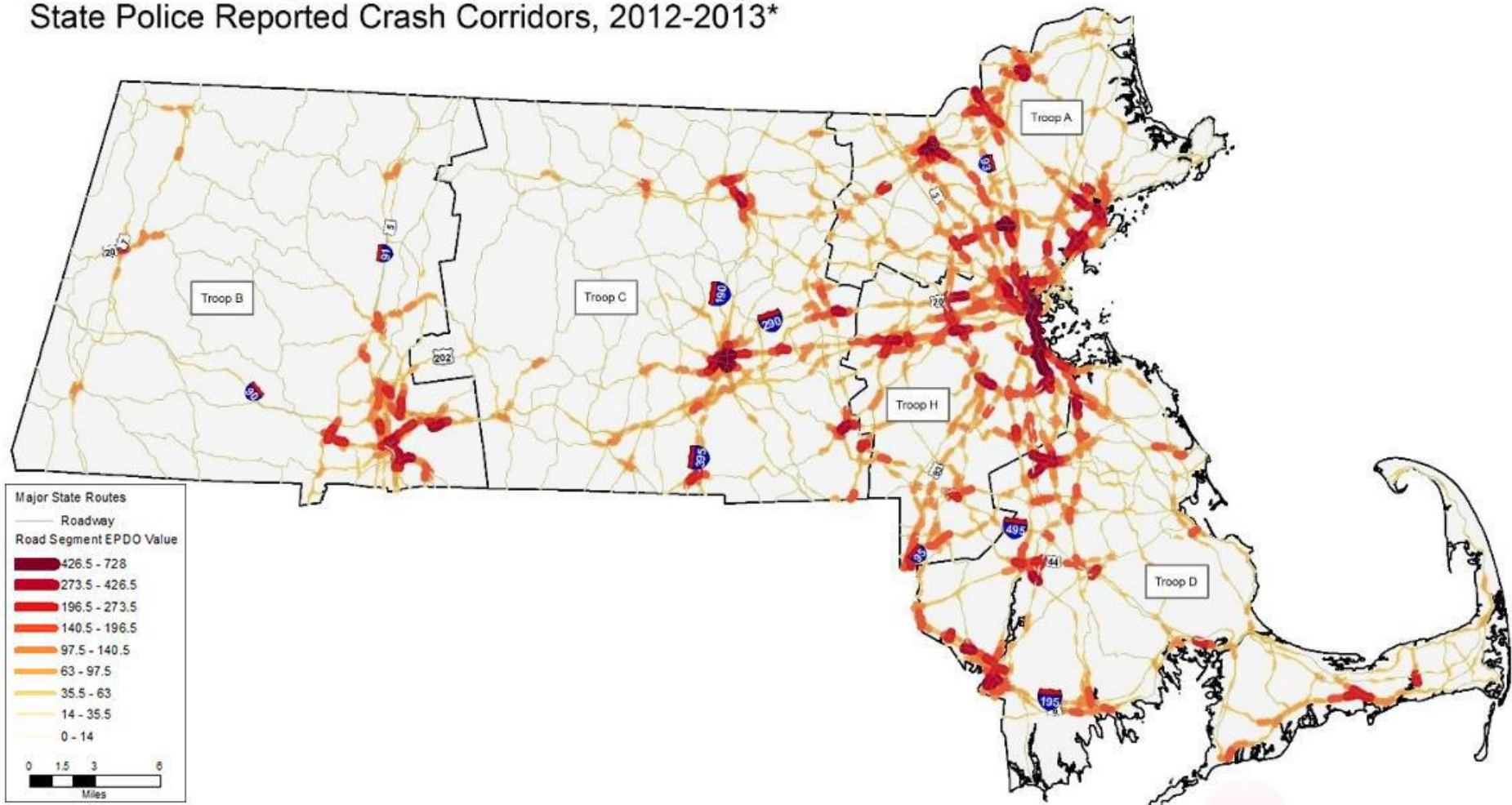
# Massachusetts Equivalent Property Damage Only Crash Corridors, 2012-2013



# Massachusetts Equivalent Property Damage Only Top 20 10-Mile Crash Corridors, 2012-2013\*

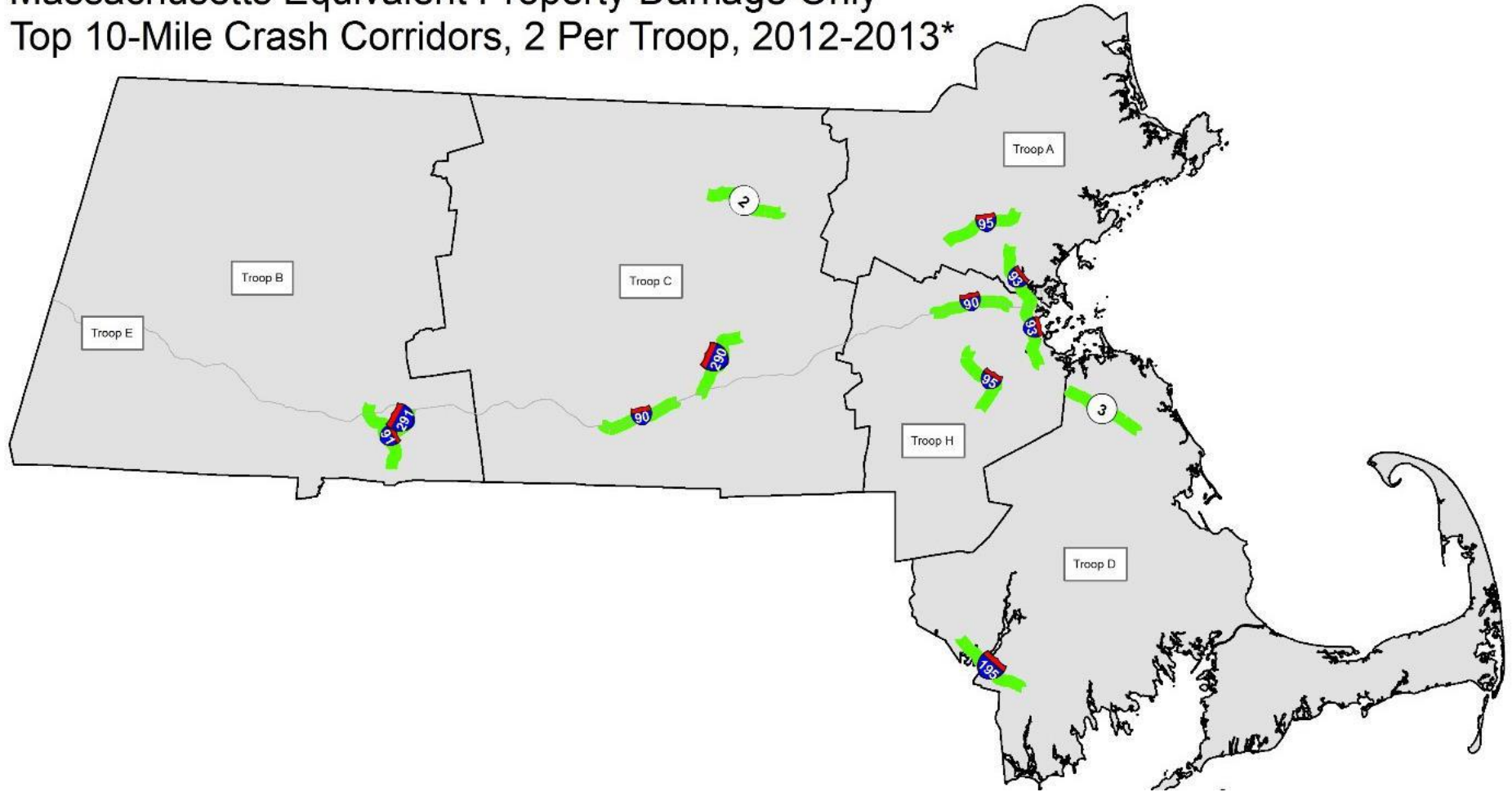


# Massachusetts Equivalent Property Damage Only State Police Reported Crash Corridors, 2012-2013\*





# Massachusetts Equivalent Property Damage Only Top 10-Mile Crash Corridors, 2 Per Troop, 2012-2013\*

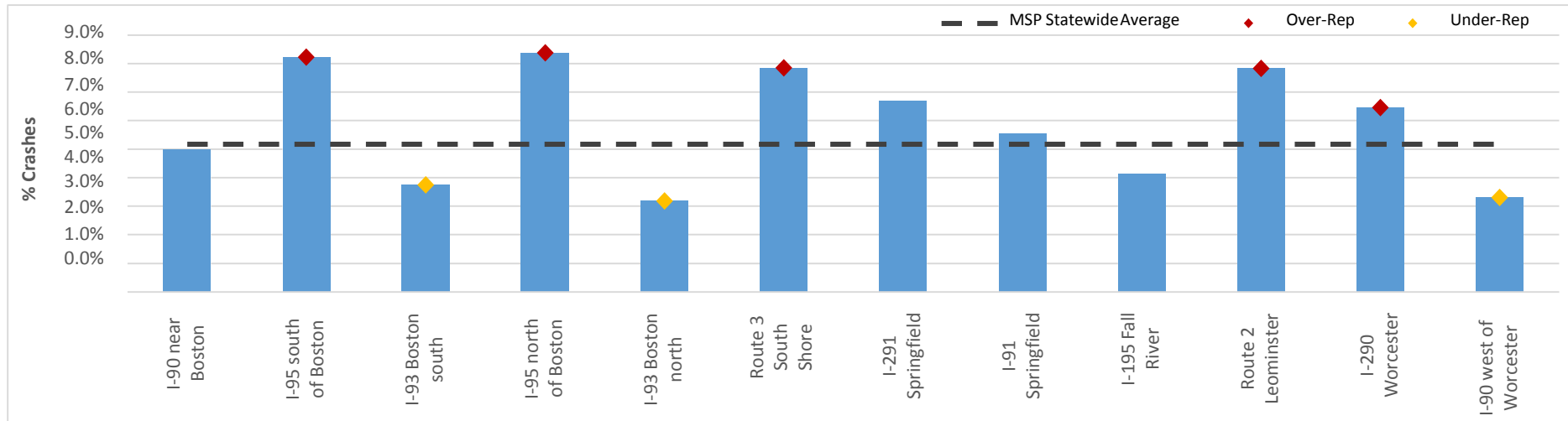


# Crash Corridor Location Details

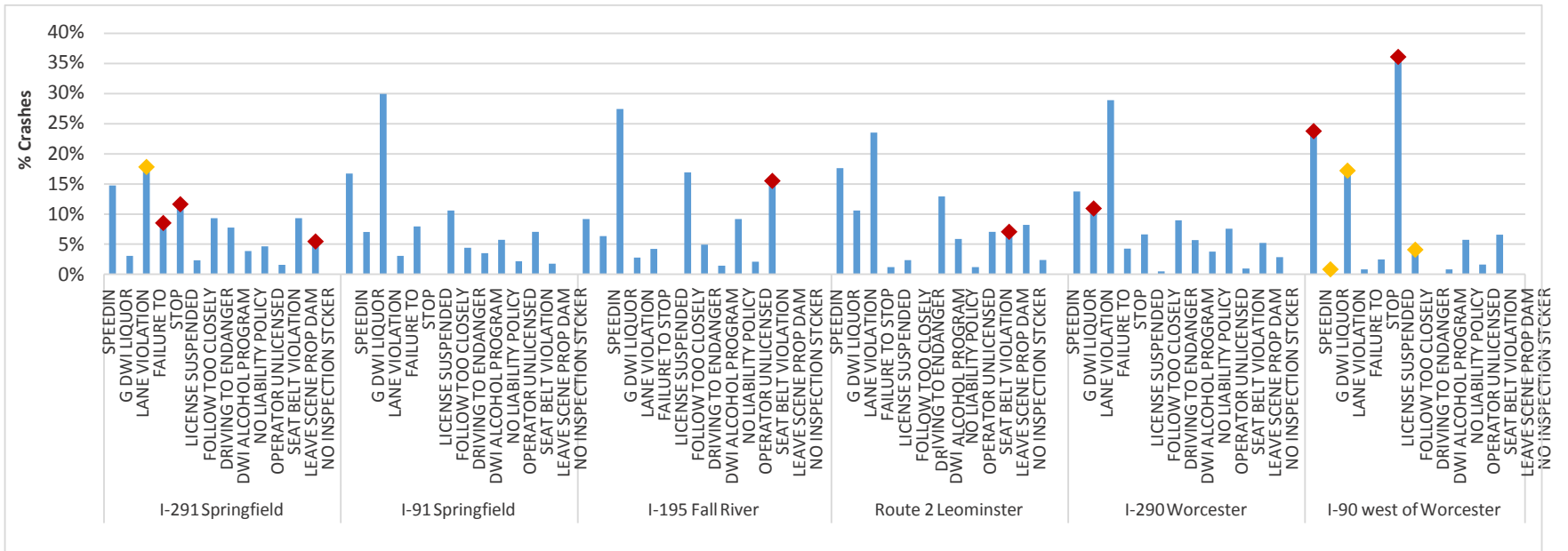
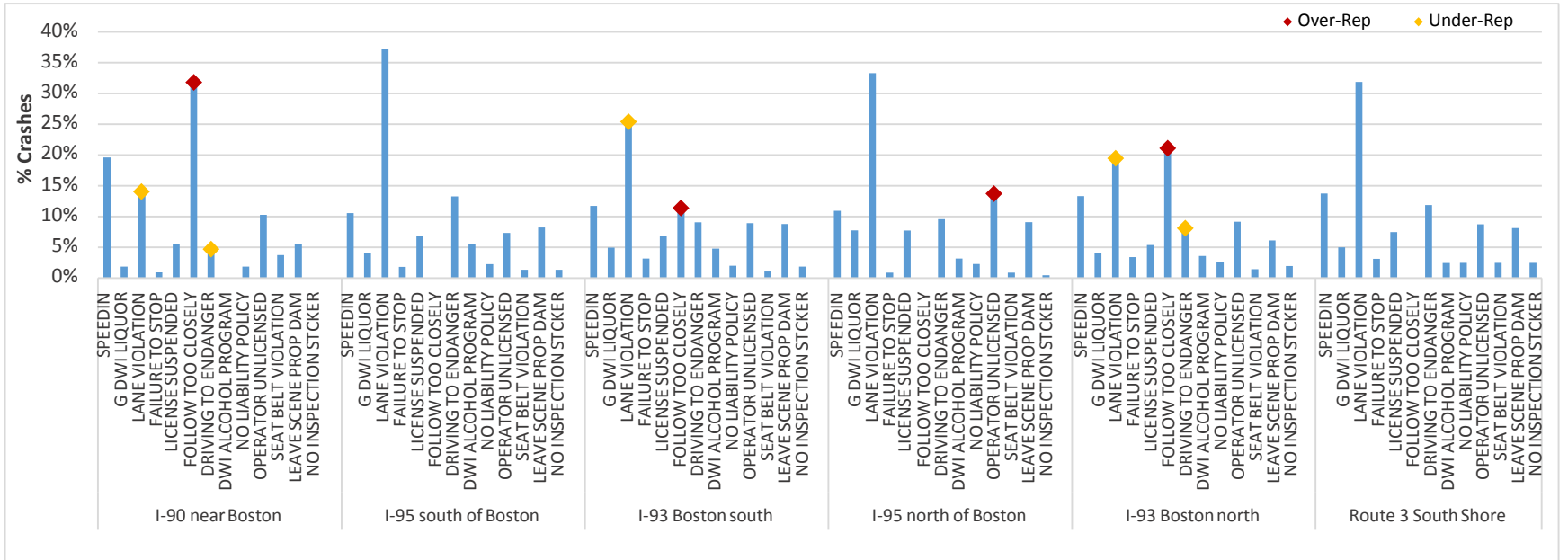
Troop	EPDO Value	Road	Corridor Description
E	10752	I-90	From Rt 20/Boston University Bridge Overpass (Boston) westbound to the Oak St Overpass (Weston)
E	6709	I-90	From the New Boston Rd Overpass (Sturbridge) eastbound to Merriam District Overpass (North Oxford)
H	2335	I-93	From Willard St on-ramp (Quincy, Exit 8) northbound to Exit 27 (U.S. 1 North/Tobin Bridge, Revere)
H	1802	I-95	From Neponset St on-ramp (Canton, Exit 11) northbound to Exit 18 (Great Plain Ave W. Roxbury)
A	833	I-93	From Montvale Avenue on-ramp (Stoneham, Woburn, Exit 36) southbound to Exit 28 (Sullivan Square Charlestown)
A	719	I-95	From Rt 129 (Wakefield Ctr, Wilmington, Exit 40) southbound to Exit 31A (Rt 4 South 225 East Lexington)
C	659	I-290	From Main St on-ramp (Shrewsbury, Exit 22) southbound to Exit 8 (Rt 12 South Webster)
B	559	I-91	From the MA/CT border northbound to Exit 15 (Lower Westfield Rd Ingleside)
D	401	Rt-3	From Rt 18/Main St on-ramp (Weymouth, Exit 16) southbound to River St Overpass (Norwell)
D	378	I-195	From Rt 6 on-ramp (Swansea, Exit 3) southbound to Exit 10 (88 South, Westport)
C	355	Rt-2	From Mt. Elam Rd on-ramp eastbound to Exit 36 (Shirley Rd, Lancaster)
B	244	I-291	Entire Length (less than 10 miles)

The selected corridor includes both directions of travel between the approximate segment boundaries.

# Corridor Analysis: Distracted Driving

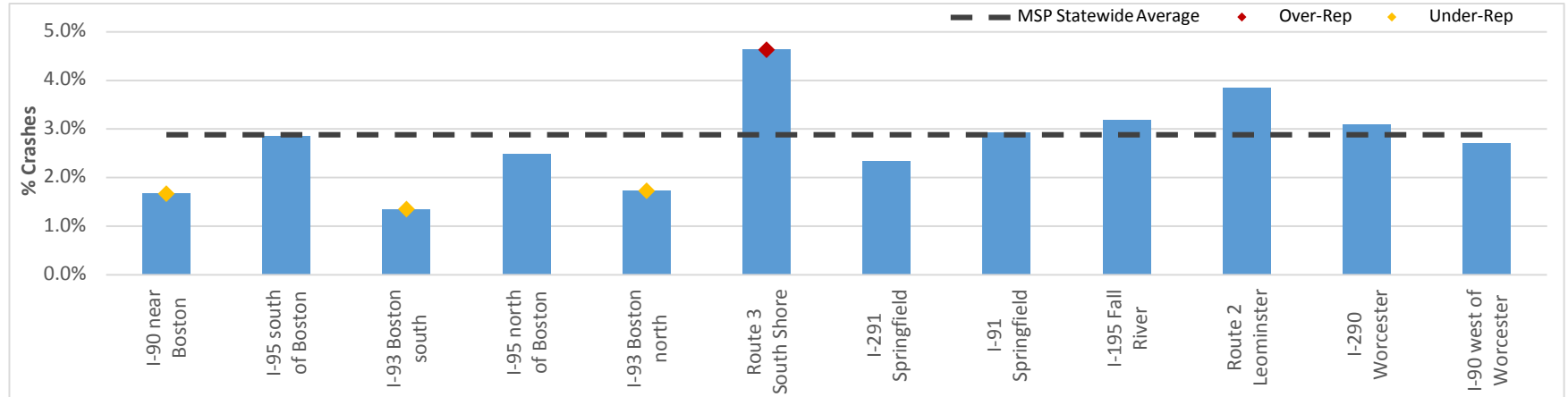


# Corridor Analysis: Violations

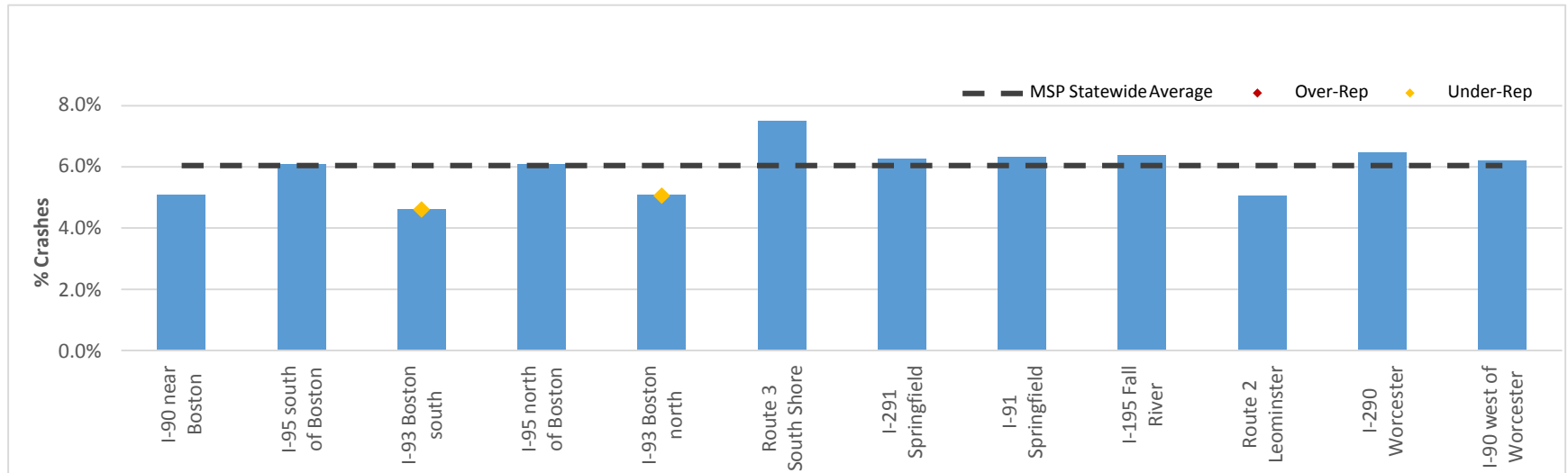


# Corridor Analysis: Teen & Older Drivers

## Teen Drivers

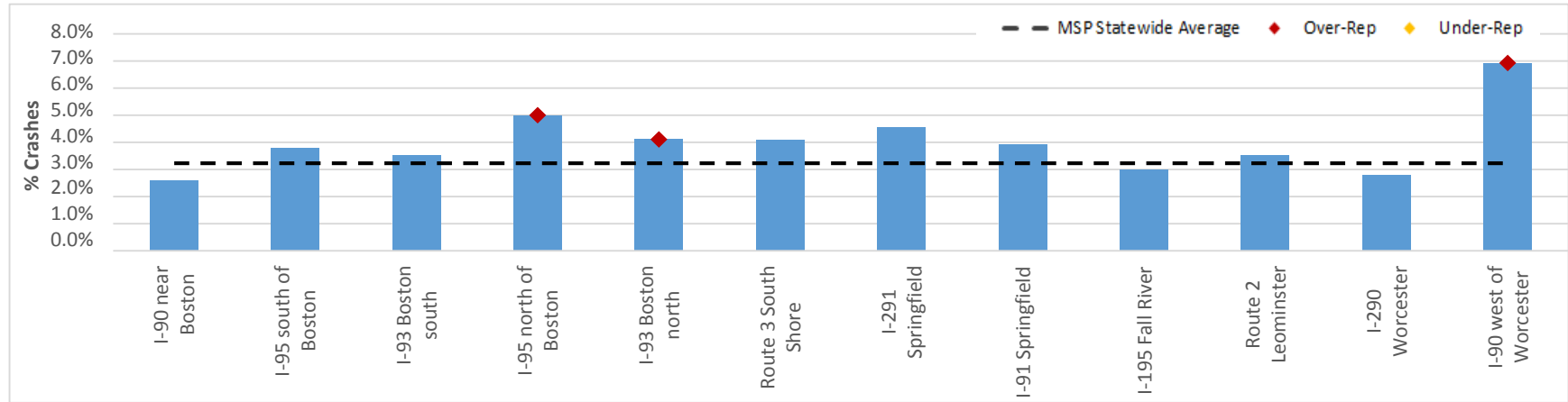


## Older Drivers



# Corridor Analysis: CMVs

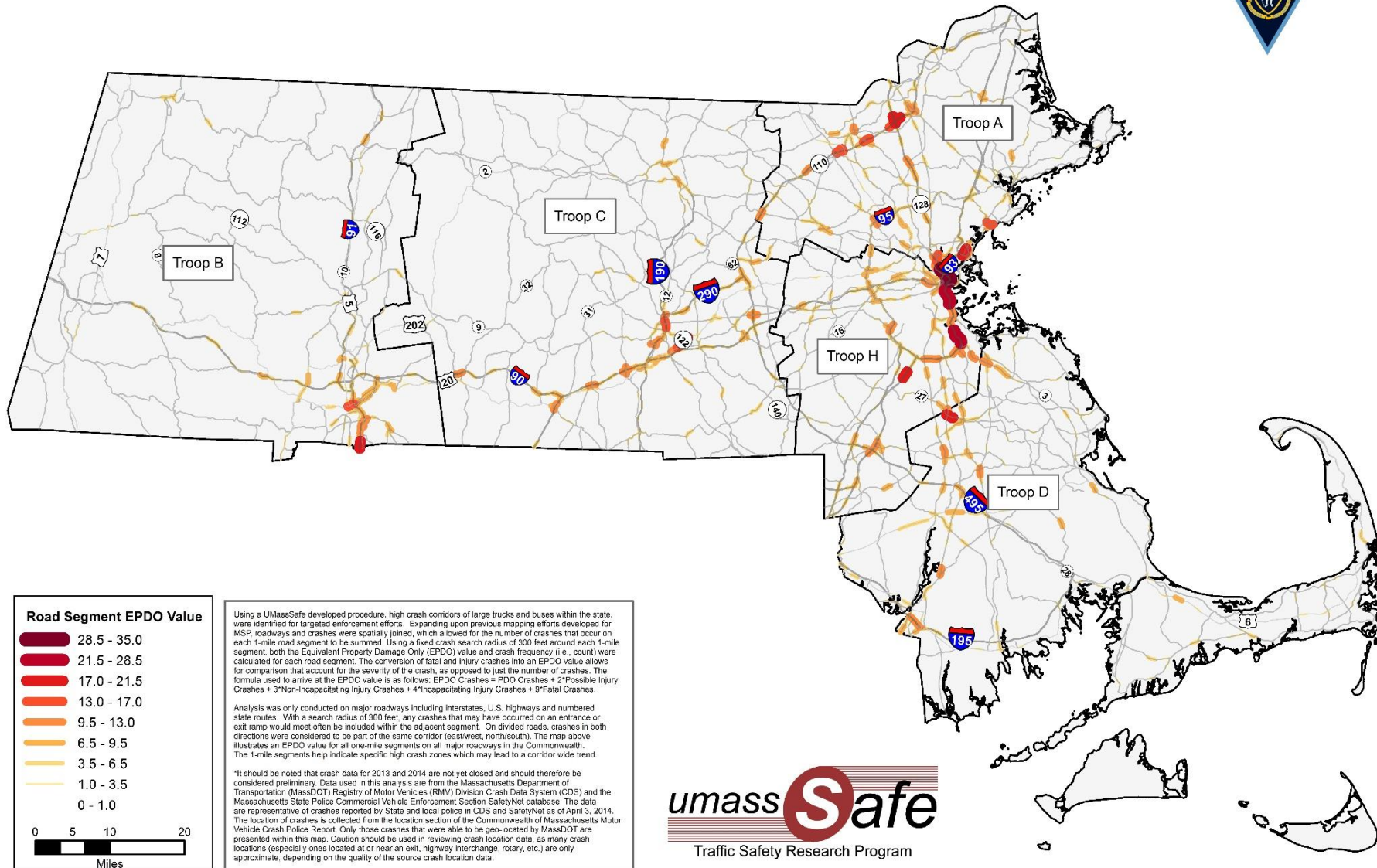
## Vehicle Type: Commercial Motor Vehicles







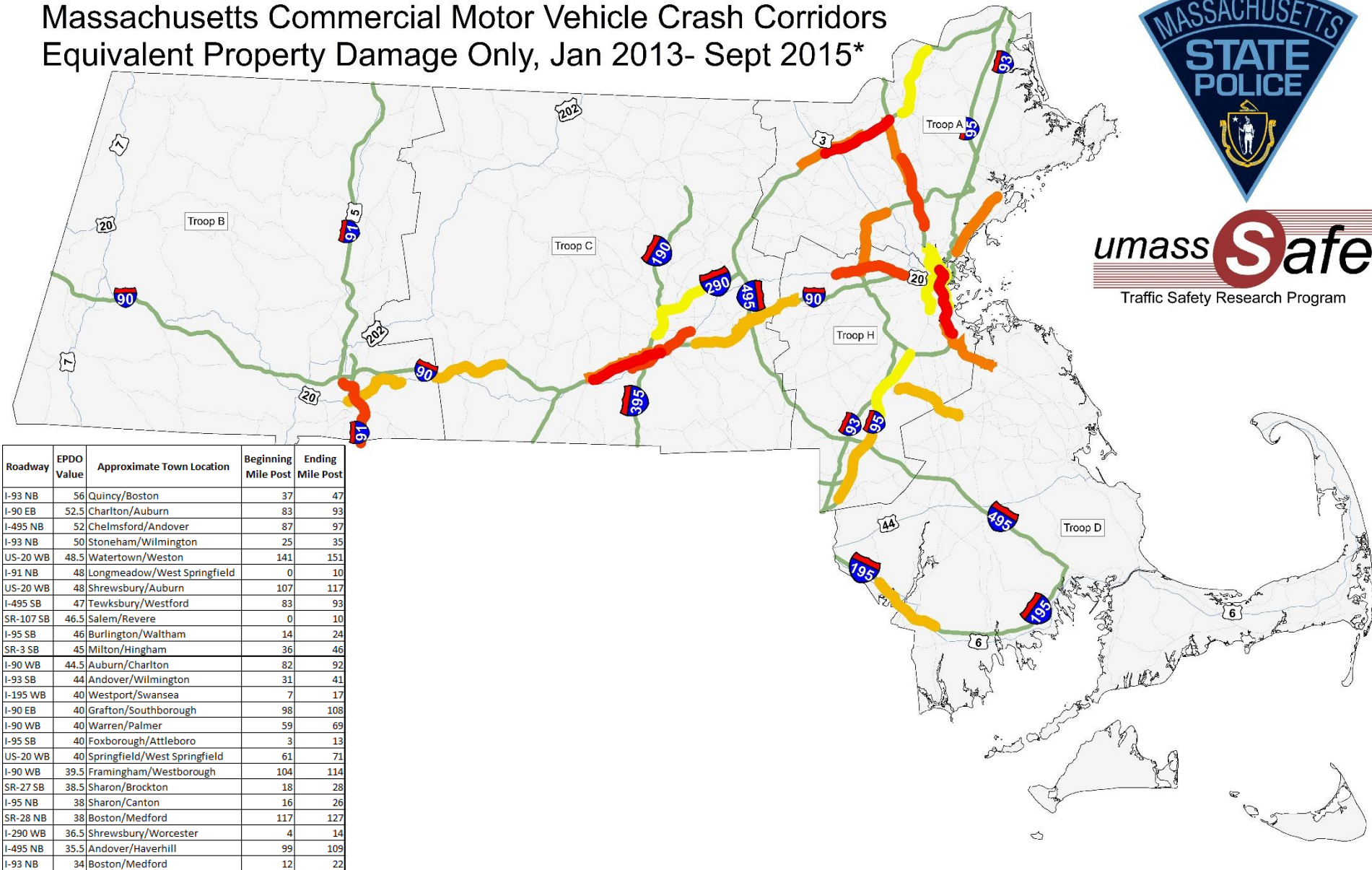
# Massachusetts Commercial Motor Vehicle Crash Corridors by Equivalent Property Damage Only, Jan 2013\* - Mar 2014\*



# Massachusetts Commercial Motor Vehicle Crash Corridors Equivalent Property Damage Only, Jan 2013- Sept 2015\*



**umass** **S**afe  
Traffic Safety Research Program



# Current TAC Topics & Needs

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- On Demand Data Analysis and Support
- Motorcoach Crash & Location Analysis
- Work Zone Crash & Locations Analysis
- Continued Crash Cost Analysis
- Continued High Crash Corridors and Hot Spots by Troop
- Weights App Deployment and TA
- Updates and maintenance of Data Tool
- Updates and maintenance of CMV Toolkit
- Grant writing
- Other

# Questions & Contact Information

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Robin Riessman – Associate Director

Jennifer Gazzillo – Project/Research Coordinator

University of Massachusetts

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